

24(3), 24(4)

000/01-c-5-27/84

AUTHORS: Krinchik, G.S. and Chetkin, M.V.

TITLE: On the Theory of Propagation of Electromagnetic Waves in Gyrotropic Media (k teorii rasprostraneniya elektromagnitnykh voln v girotroponykh sredakh)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 5, pp 703-705 (USSR).

ABSTRACT: Gyrotropic media are defined as those in which the permittivity and permeability tensors ϵ and μ have the following components

$$\epsilon_{xx} = \epsilon_{yy} = \epsilon; \epsilon_{xy} = -\epsilon_{yx} = -i\epsilon M; \epsilon_{zz} = \epsilon_0; \epsilon_{xz} = \epsilon_{yz} = \epsilon_{zx} = \epsilon_{zy} = 0;$$

$$\mu_{xx} = \mu_{yy} = \mu; \mu_{xy} = -\mu_{yx} = -i\mu M'; \mu_{zz} = \mu_0; \mu_{xz} = \mu_{yz} = \mu_{zx} = \mu_{zy} = 0.$$

The same substance may be both gyroelectric and gyromagnetic at v.h.f. (Refs 1, 2). The present note shows how it is possible to determine experimentally whether, at a given frequency, a medium is gyroelectric, gyromagnetic or possesses these two properties at the same time (bigyrotropic). For this purpose it is necessary to find the refractive index n^* by solving Maxwell's equations for plane waves,

$$\underline{H} = \underline{H}_0 \exp\{i\omega[t - n^*(\alpha^*x + \beta^*y + \gamma^*z)/c]\}.$$

When a plane wave is reflected from a gyrotropic medium in such a way

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that the magnetization vector along the z-axis is parallel to the reflecting plane (u, z) and perpendicular to the plane of incidence of the wave (equatorial magnetization) we have the following relationships

$$n_1^{*2} = \epsilon_1 \mu_0 (1 - M^2), \quad n_2^{*2} = \epsilon_0 \mu (1 - M'^2). \quad (3)$$

The value of n_1^* refers to the wave whose electric vector is parallel to the plane of incidence (the p-wave) and n_2^* refers to the wave whose electric vector is perpendicular to the plane of incidence (the s-wave). The conditions of continuity of tangential components of the electric and magnetic fields on the surface of separation between the gyrotropic medium and an ambient medium, together with the condition $\text{div } \underline{B} = 0$, lead to reflection coefficients given by Eq (4a) for the p-wave and Eq (4b) for the s-wave. In Eqs (4a) and (4b) symbols R and A represent the amplitudes of the reflected and incident waves and $\alpha = \cos \psi$, where ψ is the angle of incidence. If the medium is gyroelectric the reflection

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coefficient is given by Eq 4a and if it is gyromagnetic - by Eq 4b .
If the medium is bigyrotropic then Eqs 4a and 4b give the relative
contributions of the gyromagnetic and gyroelectric effects. The paper
is entirely theoretical. There are 3 references, 2 of which are
Soviet and 1 translation from German into Russian.

SUBMITTED: December 29, 1958

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24 (3)

AUTHORS:

Krinchik, G. S., Chetkin, M. V.

SOV/56-36-6-42/66

TITLE:

On the Problem of Determining the Tensors of the Dielectric Constant and of the Magnetic Permeability of a Medium (K voprosu ob opredelenii tenzorov dielektricheskoy i magnitnoy pronitsayemosti sredy)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1924 - 1925 (USSR)

ABSTRACT:

For the purpose of investigating gyrotropic media at optical or radiofrequencies it is of importance to know the connection between the gyrotropicity of the medium and ϵ and μ . The latter is investigated in the present "Letter to the Editor". First, the components of ϵ and μ , which are different from zero, are written down, after which the equation for the determination of the refraction index, and the latter as a function of ϵ , μ , ϵ_0 and μ_0 are written down. In the following the light refraction in the case of transversal magnetization is investigated, and equations for the reflection coefficients and the intensity variation of the light reflected from a gyrotropic medium are written down. From the formulas obtained the conclusions

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On the Problem of Determining the Tensors of the
Dielectric Constant and of the Magnetic Permeability
of a Medium

SOV/56-36-6-42/66

are, among others, drawn that metallic ferromagnetics at optical frequencies and ferrites at excessively high frequencies may have gyromagnetic properties, that the Hall effect must lead to gyroelectricity of the medium, and that ferrites and metallic ferromagnetics having a high Hall effect are bigyrotropic. There are 6 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: December 29, 1958

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CHETKIN, M. V.

SOV/4893

PHASE I BOOK EXPLANATION

Vsesoyuznoye sveshchaniye po fizike, fiziko-khimiicheskiya svoystva ferritov i fizicheskim osnovam ikh primeneniya. 36, Minsk, 1959
Fizicheskiye i fiziko-khimiicheskiye svoystva. Doklady (Abstracts); Physical and Physicochemical Properties. Reports (Abstracts). Minsk, Izd-vo AN BSSR, 1960. 655 p. Errata slip inserted. 4,000 copies printed.

Sponsoring Agencies: Nauchnyy soviet po magnetizmu AN SSSR. Otdel fiziki tverdogo tela i poluprovodnikov AN BSSR.

Editorial Board: Resp. Ed.: M. N. Sivutsa, Academician of the Academy of Sciences of the USSR; K. P. Belov, Professor, Ye. Kondorskiy, Professor, K. M. Polivanov; Professor; N. P. Galanin, Professor; J. A. Solonitskiy, Professor; K. N. Sholts, Professor; and Physical and Mathematical Sciences; Z. M. Shalimov; and M. A. Babikarov; Ed. of Publishing House: S. Zholyavskiy; Tech. Ed.: I. Volobanovich.

PURPOSE: This book is intended for physicists, physical chemists, radio electronics engineers, and technical personnel engaged in the production and use of ferrimagnetic materials. It may also be used by students in advanced courses in radio electronics, physics, and physical chemistry.

COVERAGE: The book contains reports presented at the Third All-Union Conference on Ferrites held in Minsk, Belorussian SSR. The reports deal with magnetic transformations, electrical and galvanomagnetic properties of ferrites, studies of the growth of ferrite single crystals, problems in the chemical and physical analysis of ferrites, studies of ferrites having conical hysteresis loops and multicomponent ferrite systems exhibiting spontaneous rectangularity, problems in magneto-optics, highly coercive ferrites, magnetic properties of ferrimagnetic resonance, magneto-optics, physical principles of using ferrite components in electrical circuits, anisotropy of electrical and magnetic properties. The Committee on Magnetism, AS USSR (S. V. Yonsonskiy, Chairman) organized the conference. References accompany individual articles.

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Ferrites (Cont.)	SOV/4893
Khlystov, A. S. Ferrimagnetic Materials for Lower Frequencies of the SHF Range	530
Fabrikov, V. A. On the Effectiveness of the Operation of Ferrite Components as SHF Mixers in Rectifying Systems	534
Gurevich, A. G. and I. Ye. Obblar. Investigation of the SHF Properties of Ferrites With Narrow Resonance Curve	539
Mikhaylovskiy, L. K., V. F. Balakov, and B. F. Pollak. The Transformation of SHF Electromagnetic Waves in Ferrites	560
Polivanov, K. M., L. K. Mikhaylovskiy, S. A. Medvedev, B. F. Pollak, and V. F. Balakov. Magneto-Uniaxial Ferrites at SHF	567
Kelichik, G. S. and M. V. Chetkin. Gyromagnetic and Gyroelectric Properties of Ferrites	578

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16.6500, 16.7800

77969
SOV/109-5-3-23/26

AUTHOR: Chetkin, M. V.

TITLE: ~~On a Method of Solving Abbreviated Equations of Nonlinear Systems Without Attenuation (Brief Communication)~~
On a Method of Solving Abbreviated Equations of Nonlinear Systems Without Attenuation (Brief Communication)

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 3, pp 520-521 (USSR)

ABSTRACT: The paper shows a direct method of solving shortened equations of nonlinear systems without attenuation, acted upon by external periodic forces. These equations were used, e.g., in the analysis of the strophotron, but the methods for their solution were rather cumbersome (B. Agdur, Ericsson Techn., 1957, 13, 60). The shortened equations for a system described by the differential equations:

$$\frac{d^2x}{dt^2} + x + x^3 = E \sin vt, \quad (1)$$

$$\frac{d^2x}{dt^2} + \omega^2 (1 - h \cos vt) x + \gamma x^3 = 0, \quad (2)$$

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(Brief Communication)

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are as follows:

$$\frac{da}{dt} = -\frac{R}{1+v} \cos \theta, \quad (1a)$$

$$\frac{d\theta}{dt} = 1 - v + \frac{3a^2}{8} + \frac{R}{a(1+v)} \sin \theta,$$

$$\frac{da}{dt} = -\frac{ah\omega^2}{2v} \sin 2\theta,$$

$$\frac{d\theta}{dt} = \omega - \frac{v}{2} + \frac{3\gamma a^2}{4v} - \frac{h\omega^2}{2v} \cos 2\theta. \quad (2a)$$

All designations are the same as used in the book by N. N. Bogolyubov, Yu. A. Mitropol'skiy, *Asymptotic Methods in the Theory of Nonlinear Oscillations*, Fizmatgiz, 1958. Introducing a new function $U = a^2$ and multiplying the first equations of the system (1a) and (2a) by $d\theta/dt$, the second equations by dU/dt , and subtracting the second equations of the new system from the first ones, we receive expressions which can be integrated per time. After integration we have:

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(Brief Communication)

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$$(1-\nu)U + \frac{3U^3}{10} + \frac{2E}{1+\nu} U^{1/2} \sin \theta = C_1, \quad (3)$$

$$\left(\frac{\nu}{2} - \omega\right)U - \frac{3\gamma}{8\nu} U^2 + \frac{h\omega^2}{2\nu} U \cos 2\theta = C_2, \quad (4)$$

for the first and second systems, respectively. Using (3) and (4), the shortened equations may be solved in elliptical functions of Jacobi. These solutions are periodic. Assuming, e.g., for the first system $\nu = 1$, $C_1 = 0$, it can be found that:

$$U = \left(\frac{10}{3}E\right)^{2/3} \frac{\sqrt{1 + \frac{\sqrt{3}}{2} \operatorname{cn}[B^2(t+C_2), k] - \frac{1+\sqrt{3}}{2}}}{(1+\sqrt{3})\sqrt{1 + \frac{\sqrt{3}}{2} \operatorname{cn}[B^2(t+C_2), k] + 1}}$$

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where cn is Jacoby's elliptical cosine.

$$B^2 = \left(\frac{16}{3}E\right)^2 \frac{2\sqrt{\frac{3}{2} + \sqrt{3}}}{1 + \sqrt{3}}; k^2 = \frac{2 + \sqrt{3}}{4}.$$

Solutions for (1a) and (2a) for arbitrary C , ν , ω can be found analogously. This method can be applied also to other nonlinear systems without attenuation, e.g., piecewise-linear. R. V. Khokhlov discussed the paper. There are 3 references, 2 Soviet, 1 Swedish.

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On a Method of Solving Abbreviated Equations
of Nonlinear Systems Without Attenuation
(Brief Communication)

77969
SOV/109-5-3-23/26

ASSOCIATION: Institute of Radio Engineering and Electronics AS
USSR (Institut radiotekhniki i elektroniki AN SSSR)

SUBMITTED: April 28, 1959

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24,2300 (1144,1147,11538)

30520
S/194/61/000/008/079/092
D201/D304

AUTHORS: Krinchik, G.S. and Chetkin, M.V.
TITLE: Gyromagnetic and gyroelectric properties of ferrites
PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika,
no. 8, 1961, 53, abstract 8 I343 (V sb. Ferrity.
Fiz. i fiz.-khim. svoystva, Minsk, AN BSSR, 1960,
578-586)

TEXT: The propagation is considered of plane electro-
magnetic waves in a medium with gyroelectric and gyromagnetic prop-
erties. A method is given for determining the character of the
medium gyrotropicity. The measurements carried out have shown that
the magneto-optical properties of ferrites in the visual range are
determined by the ϵ tensor properties. Determination of the μ
tensor of ferrite in the sub-millimeter and visual ranges may be
carried out by measurements with reflected light. 6 references.
[Abstracter's note: Complete translation]

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24.3600

83611
S/056/60/038/005/044/050
B006/B063

AUTHORS: Krinchik, G. S., Chetkin, M. V.

TITLE: The Faraday Effect in Yttrium Garnet at Infrared
Frequencies

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 5, pp. 1643 - 1644

TEXT: The authors measured the rotation of the polarization plane during the passage of light of a given wavelength, $\lambda = 1 \mu$, through a magnetized ferrite in the visible and in the near infrared. In these regions, the Faraday effect was found to be related to electron transitions as well as the light absorption by the ferrite. The experiments were made with $Y_3Fe_5O_{12}$ in the λ -range 0.94 - 9 μ . The authors used the modification of a previously described experimental arrangement. Polarized light passed through the sample and the analyzer which was turned by 45° relative to the polarizer. The sample itself was a single crystal 75 μ thick. Variations in the intensity of the penetrating light

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The Faraday Effect in Yttrium Garnet at
Infrared Frequencies

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within a 3500-oe field were directly measured, and the rotation of the polarization plane was calculated in degrees/cm. A diagram shows the Faraday effect in the infrared as dependent on wavelength. Near the band edge of electronic absorption at $\lambda \sim 1 \mu$, the rotation of the polarization plane decreases rapidly. Within the range of maximum transmissivity and at the beginning of phononic light absorption, the rotation is almost constant. The rotation of the polarization plane may be 1) due to electron transitions or 2) due to free electron motion. In the first case, the angle of rotation is proportional to λ^{-2} , while in the second case, it is proportional to λ^2 . The effects observed can be described in part only by the first possibility. The change in the intensity of the penetrating light, observed at $\lambda \sim 1 \mu$ with a magnetic reversal by about 30%, might be of practical importance in the construction of a controlled gyrator or light modulator. The authors thank Professor A. G. Smolenskiy for making available the single crystals of yttrium garnet. There are 1 figure and 4 references: 1 Soviet, 1 French, 1 German, and 1 US.

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83611

The Faraday Effect in Yttrium Garnet at
Infrared Frequencies

S/056/60/038/005/044/050
B006/B063

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State
University)

SUBMITTED: February 13, 1960

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X

CHETKIN, M. V.

Cand Phys-Math Sci - (diss) "Magneto-optic properties of ferrite-garnets in the infra-red area of the spectrum." Moscow, 1961. 10 pp; (Inst of Crystallography Academy of Sciences USSR); 200 copies; price not given; (KL, 10-61 sup, 205)

KRINCHIN, G.S.; CHETKIN, M.V.

Infrared electronic transition in the Er^{3+} ion. Opt.
i spektr. ll no.2:274-275 Ag '61. (MIRA 14:8)
(Infrared rays)
(Erbium--Spectra)

24.3600 (1035, 1147, 1385)

28748
S/056/61/041/003/001/020
B125/B102

AUTHORS: Krinchik, G. S., Chetkin, M. V.

TITLE: Exchange interaction and magneto-optical effects in garnet ferrites

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PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 3(9), 1961, 673 - 680

TEXT: Besides the Faraday effect caused by electron transitions, the infrared spectral range exhibits a Faraday effect which is related to the magnetic spin resonance. The equation found by L. D. Landau and Ye. M. Lifshits (Sov. Phys., 8, 153, 1955) permits studying the motion of the spin-system of a ferromagnetic. The authors experimentally studied the Faraday effect in garnets of yttrium, holmium and erbium at wave lengths from 3.5 to 8 μ , using a method they had published before. (ZhETF, 38, 1643, 1960, ZhETF, 40, 729, 1961; Optika i spektroskopiya, 11, 274, 1961). The measurements with yttrium garnet at liquid-hydrogen temperatures were brought to a greater quantitative accuracy. The results of these measure-

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S/056/61/041/003/001/020
B125/B102

Exchange interaction and ...

ments are compiled and compared with theory in Fig. 1 and in the Table. The theoretical values for all the garnets were calculated for the dielectric constant $\epsilon = 4.84$. The reflexion coefficient of light with $\lambda = 0.6\mu$ and $\lambda = 1.0\mu$ at the natural faces of the yttrium and erbium-garnet single crystals is $n = 2.2 \pm 0.2$. $4\pi I_g \approx 2.300$ oersteds at liquid-nitrogen

temperature. The Faraday effect does increase, fails, however, to reach the calculated values which correspond to magnetic saturation of the specimen. Some measurements made at 2800 oersteds, proved to agree satisfactorily with the numerical values of the Faraday rotation $\tilde{\alpha}_g$ of the plane of polarization. The experimental values of $\tilde{\alpha}_g$ for erbium and holmium garnets fit into the theory only when an exchange resonance is assumed to exist in these garnets. The change in sign of $\tilde{\alpha}_g$ as the result of cooling the

holmium garnet to liquid-nitrogen temperature is another proof of the exchange resonance of rare-earth garnets. Comparison of experimental and calculated results shows that in a certain interval of wave lengths the rotation of the plane of polarization of light in the ferromagnetic depends on the dynamic magnetic susceptibility of the ferromagnetic in the alternating magnetic field of the light wave. A Faraday effect of some ten

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Exchange interaction and...

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degrees per centimeter was measured. That is, of the same order of magnitude as the shf Faraday effect in ferrites. In visible light the Faraday effect caused by electron transitions under the action of the electric vector of the light is predominant. The change of the Faraday effect in the infrared range, permits determining the amount, the anisotropy and the temperature dependence of the g -factor of the rare-earth ions contained in the ferrite garnets. A spectrograph of the type WKC -11 (IKS-11) with an LiF prism and with an 0.2-mm slit was used to determine the Zeeman effect in the exchange field of a ferrimagnetic. The results are shown in Fig.2. The authors found a Zeeman triplet with a splitting which corresponds to a magnetic field of some 10^5 oersteds. The experimental results were completely identical with the rough theoretical estimates. It is possible that the magnetic properties of the ferromagnetics depend also in other cases on the mechanism of the splitting due to exchange. Perhaps it is also possible to control the occurrence of polarized absorption lines of a solid by a weak external magnetic field. G. A. Smolenskiy is thanked for having supplied the europium-garnet monocrystals. There are 3 figures, 1 table, and 10 references: 6 Soviet and 4 non-Soviet.

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Exchange interaction and...

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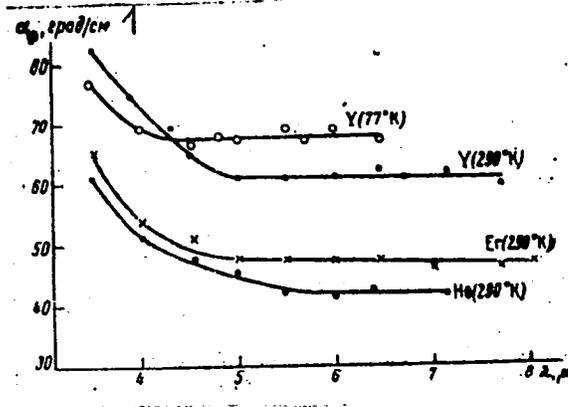
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B125/B102

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)



SUBMITTED: March 17, 1961

Fig. 1. Faraday effect in yttrium-erbium- and holmium garnets at infrared light and different temperatures; $H_{\text{external}} = 2400 \text{ oe}$.
Legend: (1) deg/cm.



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22123

24.3600(1106,1114,1137)

S/056/61/040/003/003/031
B102/B202

AUTHORS: Krinchik, G.S., Chetkin, M.V.

TITLE: The magneto-optical properties of garnet-type ferrites
in the range of infrared

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,
v. 40, no. 3, 1961, 729 - 733

TEXT: The magnetic properties of infrared-transmissive garnet-type
ferrites are determined by their three sublattices: By Fe^{3+} ions at tetra-
hedral sites (d), by Fe^{3+} ions at octahedral sites (a), and by the rare-
earth elements or yttrium (c). Since the magnetic moment of the sublattice
c is opposite to that of the iron ions, these ferrites at a certain tem-
perature show a compensation point at which the spontaneous magnetization
vanishes (the magnetic moment of c is equal to that of (a+d)). In their
investigations, the authors chose one garnet-type ferrite without a com-
pensation point, viz. $Y_3Fe_5O_{12}$ (a report on studies about the Faraday ef-
fect of this ferrite in the infrared range has been given by the authors

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S/056/61/040/003/003/031
B102/B202

X

The magneto-optical properties of ...

in an earlier paper: ZhETF, 38, 1643, 1960), and one with a compensation point (at 136°K), viz. $\text{Ho}_3\text{Fe}_5\text{O}_{12}$. The latter shows about the same, considerable saturation magnetization at room temperature and at the temperature of liquid nitrogen. The Faraday effect was measured at these two temperatures. The specimens were prepared in the form of polished single-crystal plates, about 100 μ thick, and with 0.1 cm² wide faces. An MKC-11 (IKS-11) spectrograph served as a monochromator in the measuring instrument. Infrared light polarized by a selenium reflector penetrated the crystal which was polarized perpendicularly to its surface ($H = 1500$ oersted) and fell upon the analyzer which consisted in several silver chloride plates inclined under 45° to the polarizer. A Nernst needle and a glow lamp served as light sources, a vacuum thermocell and an ФЭУ-22 (FEU-22) photomultiplier as receivers. The results of the measurements are shown in Figs. 2 (holmium garnet) and 3 (yttrium garnet). The specific rotation α of the plane of polarization is plotted on the ordinate in deg/cm. Holmium garnet shows a clear anomaly at $\lambda = 2\mu$, which, as was shown by absorption measurements, is related to the band absorption at $\lambda = 1.95\mu$. This absorption band is most likely to be connected with an electron tran-

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The magneto-optical properties of ...

S/056/61/040/003/003/031.
B102/B202

sition between the first two levels of the multiplet term $^5I_8 \rightarrow ^5I_7$.
Yttrium garnet shows a weak absorption at $\lambda = 0.92\mu$ related to an electron transition in the Fe^{3+} ions. The authors show that it is possible to study separately the effects of the various sublattices of the ferrimagnetic upon the rotation of the plane of polarization by comparing the data for holmium and yttrium-garnet ferrites. Fig. 4 illustrates the infrared transmittance of the two examined garnets. Finally, the authors thank V.A. Timofeyeva and K.P. Belov for having grown the crystals. There are 4 figures and 6 references; 3 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet
(Moscow State University) X

SUBMITTED: September 5, 1960.

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CHETKIN, M.V.

Conditions for establishment of oscillations during parametric resonance in an oscillatory system with nonlinear reactive elements. Radiotekh. i elektron. 7 no.8:1444-1448 Ag '62. (MIRA 15:8)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta im. M.V.Lomonosova. (Automatic control) (Electronics)

L 18802-65 EED-2/EEO-2/EWT(1) Pl-4/Pn-4/Pae-2 RAEM(a)/AS(mp)-2/AFMD(t)/
ESD(c)/RAEM(j)/IJP(c) CC
ACCESSION NR: AP5000699 S/0181/64/006/012/3753/3754

AUTHOR: Chetkin, M. V. 21

TITLE: Magnetic rotation of the infrared polarization plane in
yttrium ferrite-garnet 5

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3753-3754

TOPIC TAGS: yttrium ferrite film, yttrium iron garnet, single crystal
film, infrared light polarization, Faraday effect, infrared absorption
coefficient, Faraday rotation

ABSTRACT: The Faraday effect and absorption coefficient have been
measured in yttrium ferrite single-crystal films 0.17 cm thick, in
the infrared spectral region. The use of films considerably thicker
than those used in previous experiments permitted the increase of the
rotation angle of the polarization plane and therefore increased the
accuracy of the determination of the absorption coefficient. Experi-
ments were conducted at room temperature in a magnetic field of
2500 oe in an apparatus described by G. S. Krinchik and M. V. Chetkin
(ZhETF, 40, 729, 1961). The absorption coefficient in the region of

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ACCESSION NR: AP5000699

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maximum transparency was found to be much smaller than previously determined, and the light transmittance was 30%. The transparency might be increased even more, if single crystals of greater optical uniformity are used. The Faraday rotation was found to be in fairly good agreement with previous data. The investigated effects are considered important for development of guided-wave gyrators and infrared light modulators. Orig. art. has: 2 figures.

ASSOCIATION: ¹⁵⁰ Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 13Apr64

ENCL: 00

SUB CODE: SS, EM

NO REF SOV: 002

OTHER: 001

ATD PRESS: 3158

Card 2/2

ACC NR: AP6036994

(A,N)

SOURCE CODE: UR/0181/66/008/011/3388/3390

AUTHOR: Chetkin, M. V.; Solomatin, V. S.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: The magneto-optic modulation of an infrared gas laser

SOURCE: Fizika tverdogo tela, v. 8, no. 11, 1966, 3388-3390

TOPIC TAGS: gas laser, infrared laser, laser output modulation, Q switching, magneto-optic modulation

ABSTRACT: An experimental study was made of the modulation of output from an infrared gas laser by means of the Faraday effect with a view to devising a means of varying the emission intensity of Q-switching of infrared lasers. The emission from an He-Ne laser operating at 3.39μ was monitored by a GaSb photodiode. A $\text{Y}_3\text{Fe}_5\text{O}_{12}$ single crystal 0.18 cm thick was used to transmit one-half of the incident laser radiation and was placed in a 15-turn coil 1.2 cm in diameter. The 2000-oe saturating magnetic field was set up by means described elsewhere (P. L. Kapitsa, UFN, 11, 533, 1931) using discharge currents from two 0.1 and 0.004 μf condensers charged to 1 and 4 kv, respectively. The minimum magnetization time was 0.125 μsec . With the analyzer at a 45° angle to the polarization plane of the laser output, a 40% modulation of radiation intensity was observed on the oscilloscope. The correspond-

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ACC NR: AP6036994

ponding rotation of the polarization plane was 22° . Both figures agree well with the statistical analysis of the Faraday effect carried out by M. V. Chetkin (FTT, 6, 3753, 1964). Modulation of the infrared emission was also observed at 5 MHz, although at this and higher frequencies, the current in the coil had to be provided from short-pulse generators and power amplifiers. The results indicate that magneto-optic modulation can be achieved over the entire range of crystal transparency, i.e., up to 8μ , without changes in the modulation index. Magneto-optic modulation does not require crystal orientation with respect to the direction of the light propagation. The method proposed can be used in the study of the sublattice dynamics of ferromagnetics in strong, pulsed magnetic fields and in the study of relaxation processes in ferromagnetics.

SUB CODE: 20/ SUBM DATE: 20May66/ ORIG REF: 004/ OTH REF: 001/ ATD PRESS: 5107

Card 2/2

CHEPKIN, P. P.

CHEPKIN, P. P. -- "Investigation of Deformations and Thrust Forces in Rolling Sheets of Artificial Leather." Min Higher Education USSR. Moscow Technological Inst of Light Industry imeni L. M. Kaganovich. Moscow, 1955. (Dissertation for the Degree of Candidate in Technical Sciences)

SO: Knizhnaya Letopis', No 1, 1956

CHETKIN, P. P.

124-1957-10-12287

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 10, p 150 (USSR)

AUTHOR: Chetkin, P. P.

TITLE: Investigation of the Reduction of Plastic Leatherette Sheets
During the Rolling Process (Issledovaniye obzhatiya plastin iz
plastkozhnoy massy pri val'tsevanii)

PERIODICAL: Nauch. tr. Mosk. tekhnol. in-t. legkoy prom-sti, 1956, Sb 7,
pp 100-107

ABSTRACT: Experimental data are presented on the deformation of plastic
leatherette sheets during the rolling process, and an experimental
relationship between the stretching and the compressive reduction
is established. A possible improvement of the existing rolling-
process technique is discussed.

V. A. Lomakin

Card 1/1

CHEPKIN, P.P., kand. tekhn. nauk.

Stresses in rubber mixtures caused by forcing them through circular
holes. Izv.vys.ucheb.zav.; tekhn. leg. prom. no.4:98-101 '58.
(MIRA 11:12)

1. Moskovskiy tekhnologicheskiy institut legkoy promyshlennosti.
(Rubber research)

CHETKIN, P.P., kand.tekhn.nauk, dotsent

Distribution of axial forces in the rotors of rubber mixers.
Nauch.trudy MTILP no.23:155-158 '61. (MIRA 15:9)

1. Kafedra mashin i apparatov Moskovskogo tekhnologicheskogo
instituta legkoy promyshlennosti.
(Mixing machinery--Testing)

CHETKIN, P.P., kand. tekhn. nauk, dotsent

Effect of the dimension of the clearance between the rollers on
the plastic deformation. Nauch. trudy MTILP no.24:236-243 '62.
(MIRA 16:7)

1. Kafedra mashin i apparatov legkoy promyshlennosti
Moskovskogo tekhnologicheskogo instituta legkoy promyshlennosti.
(Rolling (Metalwork))

KARPACHEV, Pavel Spiridonovich; MAYZEL, Maks Mikhaylovich,
doktor tekhn.nauk, prof.; FLEVAKO, Nikolay Alekseyevich;
CHETKIN, Petr Petrovich; ZAYONCHKOVSKIY, A.D., doktor
tekhn.nauk, prof., retsenzent; ZOLOTOV, V.I., inzh.,
retsenzent

[Machinery and apparatus for the manufacture of artificial leather and film materials] Mashiny i apparaty proizvodstva iskusstvennoi kozhi i plenochnykh materialov.
[By] P.S. Karpachev i dr. Moskva, Legkaya industriya,
1964. 609 p. (MIRA 18:2)

CHETKIN, P.P., kand. tekhn. nauk, dotsent

Angle of nip in crushing rolls. Nauch. trudy MTILP no.30:219-220
'64. (MIRA 18:6)

1. Kafedra mashin i apparatov Moskovskogo tekhnologicheskogo
instituta legkoy promyshlennosti.

CHETKINA, L.A.; GOL'DER, G.A.; ZHDANOV, G.S.

X-ray diffraction study of dihalogen derivatives of anthraquinones. Kristallografiia 6 no.4:628-629 JI-Ag '61. (MIRA 14:8)

1. Fiziko-khimicheskiy institut imeni L.Ya.Karpova i Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.

(Anthraquinone) (X-ray crystallography)
(Halogen compounds)

S/070/63/008/001/016/024
E132/E460AUTHORS: Gol'der, G.A., Chetkina, L.A.

TITLE: X-ray diffraction measurements on certain substituted anthraquinones

PERIODICAL: Kristallografiya, v.8, no.1, 1963, 104-105

TEXT: The following results were obtained:

1-fluoranthraquinone. $P2_1/c$ (a,b,c) = 24.35, 3.88, 16.47 Å.
 $C_{14}H_7O_2F$ $\beta = 96^\circ$, $Z = 4$.

1-chloranthraquinone. $P2_1$ (a,b,c) = 7.90, 3.99, 17.09 Å.
 $C_{14}H_7O_2Cl$ $\beta = 96^\circ$, $Z = 2$

1-bromanthraquinone. $P2_1$ (a,b,c) = 7.86, 4.03, 17.06 Å.
 $C_{14}H_7O_2Br$ $\beta = 95^\circ$, $Z = 2$

1-iodoanthraquinone. $P2_1$ (a,b,c) = 7.90, 4.24, 17.04 Å.
 $C_{14}H_7O_2I$ $\beta = 92^\circ$, $Z = 2$.

The above crystals appear to be isomorphous, except for the
Card 1/2

S/070/63/008/001/016/024
E132/E460

X-ray diffraction ...

F derivative.

2,6-dimethyl ester of anthraquinone carboxylic acid

$C_{14}H_{16}O_2(COOCH_3)_2$ Cc or C2/c (a,b,c) = 24.34, 6.21, 19.44 Å
 $\beta = 94^\circ$, Z = 8

ASSOCIATION: Fiziko-khimicheskiy institut im. L.Ya.Karpova
(Physico-chemical Institute imeni L.Ya.Karpov)

SUBMITTED: July 18, 1962

Card 2/2

S/070/63/008/002/002/017
E021/E120

AUTHORS: Chetkina L.A., Gol'der G.A., and Zhdanov G.S.

TITLE: Crystal structure of 1.5-dibromanthraquinone

PERIODICAL: Kristallografiya, v.8, no.2, 1963, 194-200

TEXT: Single crystals of 1.5-dibromanthraquinone
[$(C_7H_3O)_2Br_2$] in the form of long dark-yellow needles were

obtained by slow evaporation from a solution in pyridine and also by sublimation in a normal atmosphere. The parameters of the

monoclinic unit cell were found by X-ray measurements to be:

$a = 11.24 \pm 0.02$, $b = 13.43 \pm 0.03$, $c = 3.93 \pm 0.01 \text{ \AA}$,

$\beta = 91^\circ 23' \pm 12'$, $V = 598 \text{ \AA}^3$. The density was calculated from

the data to be 2.03 g/cm^3 which is close to the value obtained from pycnometric measurements (2.02). The number of molecules in the unit cell is two, and the space group is

$C_{2h}^5 - P2_1/a$. The deviation of the bromine and oxygen atoms on different sides of the plane of the anthraquinone ring was found to be 0.158 and -0.130 \AA respectively. The bond lengths of

Card 1/2

Crystal structure of ...

S/070/63/008/002/002/017
E021/E120

C - Br and C - O were 2.00 and 1.34 Å respectively.
There are 5 figures and 3 tables.

ASSOCIATION: Fiziko-khimicheskiy institut im. L.Ya. Karpova
(Physicochemical Institute imeni L.Ya. Karpov)

SUBMITTED: June 27, 1962

Card 2/2

CHETKINA, L.A.; GOL'DER, G.A.

Crystalline structure of 1,5-dihydroanthraquinone. Kristallografiia
8 no.4:582-586 J1-Ag '63. (MIRA 16:9)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.
(Anthraquinone)

CHETKINA, L.A.; GOL'DER, G.A.

Elementary cells and space groups of substituted α α -
difluorostilbenes. Zhur. strukt. khim. 5 no.5:798-799
S-0 '64 (MIRA 18:1)

1. Fiziko-khimicheskiy institut imeni L. Ya. Karpova.

SEGAL, Pawel; CHETKO, Edward

The problem of mycotic eye diseases. Pol. tyg. lek. 20 no.24:
885-888 14 Je '65.

1. Z Kliniki Chorob Oczu Wojskowej AM (Kierownik: prof. dr. med.
P. Segal).

CHETKIN, V. M.

YEVDOKINOV, M.M.; POLYAKOVA, A.Ya.; LEBEDEVA, V.Ye.; GENERALOV, G.F.;
KONSTANTINOVA, N.N.; YEGOROVA, G.S.; CHETKIN, V.M.; KAZAKOVA,
Ye.D., red.; ZUBRILINA, Z.P., tekhn. red.

[New kinds of vegetables, melons, squashes, and potatoes] Novye
sorta ovoshchnykh, bakhchevykh kul'tur i kartofelia. Moskva, Gos.
izd-vo sel'khoz. lit-ry, 1956. 124 p. (MIRA 11:10)
(Vegetables) (Vine crops) (Potatoes)

SEGAL, Pawel, prof. dr. med.; CHETKO, Edward; RDZANEK, Irena

Research on the role of corticosteroids in the pathogenesis of
mycotic corneal infections. Klin. oczna 35 no.2:337-342 '65.

1. Z Kliniki Chorob Oczu Akademii Medycznej w Lodzi
(Kierownik: prof. dr. med. P. Segal).

CHEKOV, V.A.; DYUKOV, Ye.Ye.

Water heating systems operating with the aid of steam injectors.
Vod.i san.tekh. no.4:24-27 Ap '56. (MLRA 9:8)
(Hot-water heating)

CHEKOV, V.A. (Leningrad).

Controlling gas liberation when filling buckets with slag and metal
in tin industry plants. Vod. i san. tekhn. no.4:14-15 Ap '57.
(Gases, Asphyxiating and poisonous) (MIRA 10:6)
(Smelting--Hygienic aspects)

CHETKOV, V.A.

137-58-5-9224

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 66 (USSR)

AUTHOR: Chetkov, V.A.

TITLE: Ventilation of Bridge Crane Control Booths in Pyrometallurgical Shops (Ventilyatsiya kabin mostovykh kranov v pirometallurgicheskikh tsekhakh)

PERIODICAL: Byul. Tsentr. in-t inform. M-va tsvetn. metallurgii SSSR, 1957, Nr 4, pp 22-24

ABSTRACT: Several methods for ventilation of control booths of bridge cranes employed in pyrometallurgical shops are examined. In particular, the author mentions the shops of the **Chimkent** lead plant, the Podol'sk tin plant, and the "Severonikel'" Kombinat. G.S.

1. Metallurgy 2. Cranes--Ventilation. 3. Industrial plants
--Equipment

Card 1/1

CHEKOV, V.A.; DYUKOV, Ye.Ye.(Leningrad)

Border suction and blowing off currents in electric stoves of
a smelting shop of the Novosibirsk Tin Plant. Vod.i san.tekh.
no.7:28-31 J1 '57. (MIRA 10:11)

(Tin)

(Smelting)

CHEPKOV, V.A. (Leningrad)

Ventilation of crane operator cabins. Vod. i san. tekhn. no.6:24-27
Je '59. (MIRA 12:8)

(Ventilation)

(Cranes, derricks, etc.)

MOLCHANOV, B.S.; CHETKOV, V.A.; ABRAMOVICH, S.A., inzh., nauchn.
red.

[Designing industrial ventilation systems; a manual for
designers] Proektirovanie promyshlennoi ventilatsii; po-
sobie dlia proektirovshchikov. Leningrad, Stroizdat,
1964. 278 p. (MIRA 17:12)

CHETKOV, V.A., inzh.; LYAPINA, V.F., inzh.

Ventilation of main units of agglomeration factories. Vol. 1
san. tekhn. no.6:20-21. Je '65. (MIRA 18:8)

CHETKOV, V.A., inzh. (Leningrad); LYAPINA, V.F., inzh. (Leningrad)

Localization of gases at sites of their formation in
smelting plants of nonferrous metallurgy. Vod. i san. tekhn.
no.10:12-13 0 '65. (MIRA 18:11)

CHETKOV, V.A., inzh.; LYAPINA, V.F., inzh.

Aspiration of the sinter sifting and delivery units in crushing
and sintering factories. Vod. i san. tekhn. no.11:33-34 N '65.
(MIRA 18:12)

CHETKOVICH, S. I.

Aspirant

"Subcutaneous Injections of Oxygen in Breasts-Fed Babies During Pneumonia,"
Vop. Ped. i Okhran. Mater. i Det., 17, No.2, 1949

Chair Faculty Pediatrics

FENIGSEN, R.; BALLANDOWICZ, K.; CHETKOWSKA, E.

Pulsus bisferiens. Kardiol. Pol. 7 no.4:331-336 '62

CHETKOWSKA, Maria; SOSIN, Zofia; STRZESZEWSKA, Irena

Complexometric determination of zinc in analytical control of zinc compounds. Application of complexometric methods for zinc ash analysis. Determination of lead, iron aluminum and zinc. Chem anal 6 no.3:309-316 '61.

1. Analytical Department, Institute of Inorganic Chemistry, Gliwice.

CHETKOWSKA, Maria; SOSIN, Zofia; STRZESZEWSKA, Irena

Simultaneous determination of zinc and magnesium by complexometric titration. Chem anal 6 no.3:317-322 '61.

1. Analytical Department, Institute of Inorganic Chemistry, Gliwice.

CHETKOWSKA, Maria, mgr., inz.; GALLUS-OLENDER, Joanna, mgr., inz.;
STRZESZEWSKA, Irena, inz.

The continuous control of hydrogen sulfide content in air. Chemik 14
no.10: 0 '61.

1. Zakład Analityczny, Instytut Chemii Nieorganicznej, Gliwice.

ENCLOSURE

197111, Andrzej; Hanna CHOROZOWSKA and Andrzej CHWIEKOWSKI.
Principles of Infectious Diseases (Klinika Chorob Zakaznych)
in Akademia Medycyny -- Medical School, in Lodz, Director:
Docent Dr Med J. CHOROZOWSKI.

"The Hemagglutination Reaction with Hen Blood Cells in
Infectious Hepatitis. Interim Report"

Lodz, Przegląd Lekarski, Vol 13, No 12, 62, pp 451-463.

Abstract: Authors' English summary modified Observations
of the ability of human serum to agglutinate the erythro-
cytes of the chicken cock are presented. Tests were made
in 337 cases: 122 of infectious hepatitis, 13 persons who
had had infectious hepatitis, 25 contacts with infectious
hepatitis, 7 cases of mechanical jaundice, 29 cases of
various diseases of viral and non-viral origin and 41
control subjects. The results of a comparison of the values
of the test titres in the particular reports are discussed.
The diagnostic value of the procedure is discussed. 1 table.
1 reference, mostly Western.

/1

CHEFORAREVA, Ye.I.

Lumbar novocaine block as conduction anesthesia. Khirurgia no.4:36-37
Ap '53. (MLRA 6:6)

(Novocaine) (Local anesthesia)

L 11088-63

EWP(k)/EWP(q)/EWT(m)/BDS--AFFTC/ASD--PF-l--JD

ACCESSION NR: AP3000749

S/0020/63/150/003/0541/0543

62
61

AUTHOR: Medovar, B. I.; Pinchuk, N. I.; Chatotilo, L. V.

TITLE: Increasing the upper limits of phosphorous and silicon in fully austenitic welds

17 27

SOURCE: AN SSSR. Doklady, v. 150, no. 3, 1963, 541-543

TOPIC TAGS: welding, fully austenitic steel, hot cracks, boron effect, silicon effect, phosphorous effect

ABSTRACT: The effect of boron on susceptibility to hot cracking of fully austenitic Cr-Ni steel welds has been studied. Currently the Si content must be kept below 0.25% and the P content below 0.020% to reduce hot cracking. This, however presents serious difficulties in melting these steels. Adding 0.3-0.6% boron to 25-20 and 15-35 type austenitic steels solved the problem and made it possible to weld steels containing 0.53-0.63% Si and 0.020-0.94% P. The addition of boron results in the formation of a complex Fe-Ni-Cr-B eutectic, capable of dissolving Si, P, and other liquating elements. Mechanical tests made on 25-20 and 15-35 austenitic welds (see Table 1 of Enclosure) showed that boron-bearing welds annealed at 1100C have satisfactory mechanical properties, though somewhat

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L 11088-63

ACCESSION NR: AP3000749

inferior to those of boron-free welds. At high temperatures, however, the difference becomes negligible (see Table 2 of Enclosure). The rupture life of welds C, D, and E, at 800C under a stress of 10 kg/mm² (after 10-hr stabilization at 800C) was 78, 192, and 213 hr.

ASSOCIATION: Institut elektrosvariki im. Ye. O. Patona Akademii nauk SSSR
(Electric Welding Institute, Academy of Sciences, USSR)

SUBMITTED: 05Nov62

DATE ACQ: 21Jun63

ENCL: 01

SUB CODE: ML,MA

NO REF SOV: 004

OTHER: 000

Card 2/3

STOIANOV, K., prof.; ARNAUDOV, D., dotsent; CHETRAFILOV, D.; DIMITROV, A.

Surgery in the newborn infant. Khirurgia 15 no.11:989-990
'62.

1. Nialoi statisticheski danni iz deimostta na detskoto
khirurgichno otdelenie kum Katedrata po boinichna khirurgia
pri ISUL [Institut za spetsialisatsia i usuvurshenstvuvane
na lekarite].

(INFANT NEWBORN DISEASES)

CHETRAFILOV, D.

Successful surgery in a case of mesenterium commune in a newborn. Khirurgiia (Sofiiia) 16 no.7:665-666 '63.

1. Iz Klinikata po bolnichna khirurgiia pri ISUL [Institut za spetsializatsiia i usuvurshonstvuvane na lekarite].

(MESENTERY) (INFANT, NEWBORN, DISEASES)
(SURGERY, OPERATIVE) (INTESTINAL OBSTRUCTION)
(DIAGNOSIS, DIFFERENTIAL) (MELENA)

CHETRAFILOV, D.

Unusual localization of a glomus tumor. Khirurgiia (Sofia)
17 no.5:612-613 '64

1. Iz Katedrata po bolnichma khirurgiia, Institut za spetsializatsiia i usuvurshenstvuvane na lekarite, Sofia.

CHETRAFILOV, D.

2 cases of mesenterium commune. Khirurgiia (Sofia) 18 no.4:
484-486 '65

1. Katedra po bolnichna khirurgiia, Institut z spetsializatsiia
i usuvurshenstvuvane na lekarite, Sofia i Okrushna bolnitsa,
Pazardzhik (gl. lekar - Khr. Sh'erev).

CHETRAELLOV, D.; OBREYKOV, L.; TANKOV, Iv.; ANDONOV, G.

A case of a large solitary calcified renal cyst. Khirurgiia
(Sofia) 18 no.5:599-601 '65.

1. Okryzhna bolnitsa, Pazardzhik (gl. lekar St. Stanchev).

BRAHA, Al., ing.; STEFAN, Al., ing.; CHETRARU, D., ing.

A method for experimental determination of the self-purification
of water courses. Hidrotehnica 6 no.9:329-332 S '61.

CHEIROIU, A

Collimation of atomic beams. I. Agribiceanu, V. Drăgănescu, and A. Cheiroiu, Acad. rep. populare Romine, Inst. fis. atomice si Inst. fiz. Stiint. cercetari fiz. 10, 247-54 (1959); cf. Crawford, et al., C.A. 45, 2314a.—Investigations have been carried out, concerning the collimation of the beam, of an at. beam tube, the following being detd.: optimum functioning temp. of the furnace, atom distribution in the metal deposit, the collimation factor, the equiv. temp. of the atoms in the beam, and the Doppler width assocd. with this temp. The metal employed was Pb, which is vaporized readily at relatively low temps. Results agreed well with theoretically predicted values. The optimum width of the beam corresponded to a certain width of the gap. The value calcd. for the Doppler half-width of the tube employed was 0.0008 cm.⁻¹; this corresponds to a temp. of 4.3°K. M. Lapidot

ep

ZEMLYANOV, M. G.; KAGAN, D. M.; CHERNOPLEKOV, N. A.; CHETSERIN, A. G.

"The study of the phonon spectrum and dispersion curves in vanadium"

Paper to be presented at the International Atomic Energy agency
(IAEA) - Symposium on Inelastic Scattering of Neutrons in Solids
and Liquids - Chalk River, Canada, 10-14 Sept. 1962

CHERNOPLEKOV, N. A.; ZEMLYANOV, M. G.; CHETSERIN, A. G.

"The study of inelastic scattering of neutrons in the Ti-Zr alloy"
Paper to be presented at the International Atomic Energy
Agency (IAEA) - Symposium on Inelastic Scattering of Neutrons
in Solids and Liquids - Chalk River, Canada, 10-14 Sept. 1962

CHEVELEVA, Nina Alekseyevna; PAVLOVA, A.I., red.

[Correction of speech in stammering preschool children]
Ispravlenie rechi u saikauushchikhsia doshkol'nikov.
Moskva, Prosveshchenie, 1965. 85 p. (MIRA 18:12)

GLADKIY, M.F.; CHETVERGOV, Ye.V.; LEONT'YEV, A.L., kand. sel'skokhoz. nauk

Pay attention to sweet clover. Zemledelie 27 no.4:62-64 Ap '65.
(MIRA 18:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut kormov (for Gladkiy). 2. Glavnyy agronom sovkhoza "Mamalayevskiy" Mordovskoy ASSR (for Chetvergov).

GOKHMAN, V.; CHEVVERGOVA, A.D., red.; CHIZHOV, N.N., red.

[Central America and the West Indies] TSentral'naia Amerika i Vest-Indiia. Scale 1:5000000. Moskva, Gos.izd-vo geogr. lit-ry, 1959. fold. col.map. ___Gokhman, V., TSentral'naia Amerika i Vest-Indiia. 41 p. (MIRA 13:6)

1. Russia (1923- U.S.S.R.) Glavnoe upravlenie geodezii i kartografii.

(Central America--Maps)

(West Indies--Maps)

TARTAKOVSKIY, B.N., kand. tekhn. nauk; GLUSKIN, I.I., kand. tekhn. nauk;
GAVRILYUK, I.I., inzh.; CHETVERIK, M.S., inzh.

Graphoanalytical method of investigating the regime stripping
operations. Sbor. trud. VNIIMerud no.4:33-41 '65.
(MIRA 18:11)

05931
SOV/107-59-7-34/42

9(

AUTHOR: Chetverik, V.

TITLE: FM Indicators

PERIODICAL: Radio, 1959, Nr 7, pp 51-54 (USSR)

ABSTRACT: The author describes three circuit diagrams of FM indicators. These devices have many applications in electronics; for tuning TV sets, for telemetering and measuring purposes. The function of an FM indicator is explained using the circuit diagram in Figure 2. This indicator consists of one 6Zh5P, one 6N15P and two 6Kh2P tubes, and requires careful manufacture and tuning. It may be installed in an aluminum housing of 40x80x120 mm. Coil data is given for the measuring range of 20-40 Mc. A properly tuned FM indicator will work reliably with a 10-15 millivolt input signal. For tuning and adjusting TV sets, an FM indicator may be combined with a signal generator, as shown in Figure 4. The generator consists of

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SOV/107-59-7-34/42

FM Indicators

one 6N15P tube. One 6Zh3P and one 6N1P are used in the indicator. The author explains briefly the tuning procedure for a TV set. Finally, the author presents an example for applying a FM indicator for measuring purposes. The circuit diagram of a pressure indicator is shown in Figure 5. It consists of the following tubes: one 6K4P, two 6P1P, one 6Kh2P, one 6Ts4P and one SG1P. The device consists of a generator (6K4P) producing 460 kc, the FM indicator and the power supply unit. The author describes a capacitance transducer, shown in Figures 6 and 7, which may be used for measuring deformations in concrete. There are 3 circuit diagrams, 1 block diagram, 1 graph, 3 diagrams and 1 Soviet reference.

Card 2/2

AUTHOR: Chetverikov, A.F.

32-18-18/71

TITLE: Short Reports (4) (Korotkiye soobshcheniya)

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 12, pp. 1437-1437 (USSR)

ABSTRACT: In this paper a new method for the colorimetric determination of free phenol in resins (and/or resin laquers) is recommended, which is based upon the formation of yellow products of the compound composed of phenol and diazo-sulphanilic acid. In order to obtain the necessary reagent 0,8 g of the sulphanilic acid crystallized out of the hydrochloric acid solution is dissolved in 9 ml of concentrated hydrochloric acid. This solution is diluted with water up to a total volume of 100 ml. Such a solution must not exceed a temperature of 5°. Under these conditions (5°) a dose of 2 ml is diazotized, and mixed with 2 ml of the 15% KNO₂ solution. After 5 minutes 15 ml of the same KNO₂ solution is added, which is this time cooled down to 0°. This solution is diluted with cold water down to 100 ml. This final solution should best be used immediately and must not be kept longer than 1 day at a temperature below 5°. For the purpose of determining phenol its aqueous solution is first mixed with 5 ml of the 20% soda solution. To this 11 ml of the above mentioned cooled

Card 1/2

Short Reports (4)

32-18-18/71

test solution are added, and the whole is diluted to 25 ml and colorimetricized.

ASSOCIATION: Sverdlovsk "Plastmass" Works (Sverdlovskiy zavod "Plastmass")

AVAILABLE: Library of Congress

Card 2/2 1. Resins-Free phenol determination-Colorimetric method

L 54555-65 EWT(m)/EWG(m)/EWP(m) Pc-4 RWH/RM
ACCESSION NR: AP5016713

UR/0286/65/000/010/0016/0016 ²⁴₁₃

AUTHORS: Samborskiy, I. V.; Pashkov, A. B.; Saldadze, K. M.; Grachev, D. I.;
Yakovlev, I. M.; Parkaforkov, A. N.; Perevorkin, G. A.;

TITLE: A method for producing ion exchangers. Class 12, No. 11221 16

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 10, 1965, 16

TOPIC TAGS: ion exchanger, chemical production, filler, cotton, fiber

ABSTRACT: This Author Certificate presents a method for producing ion exchangers by mixing (in a determined order) the combined components, heating, holding, cooling, and consolidating the reactive mass, which is finally crumbled and dried. To improve the mechanical, filtering, and absorption properties of the exchangers, a fibrous filler, such as cotton floss, is introduced into the reactive mixture before drying.

ASSOCIATION: Nauchno-issledovatel'skiy institut plasticheskikh mass (Scientific Research Institute of Plastics)

SUBMITTED: 24Jul64

ENCL: 00

SUB CODE: GC

NO REF SOV: 000

OTHER: 000

Card 1/1 *RL*

ACC NR: AP70001407

(A)

SOURCE CODE: UR/0413/66/000/021/0109/0109

INVENTOR: Chetverikov, A. F.; Pashkov, A. B.; Samborskiy, I. V.; Grachev, L. L.

ORG: none

TITLE: Preparative method for polymers containing anthraquinone redox groups.
Class 39, No. 187999 [announced by Scientific Research Institute of Plastics
(Nauchno-issledovatel'skiy institut plasticheskikh mass)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 21, 1966, 109

TOPIC TAGS: redox polymer, polyvinylathraquinone, *styrene, quinone,*
sulfuric acid

ABSTRACT: An Author Certificate has been issued for a preparative method for
polymers containing anthraquinone redox groups, based on styrene and divinylbenzene.
A styrene-divinylbenzene copolymer is treated with phthalic anhydride in an inert
solvent in the presence of an excess of aluminum chloride, and the resulting poly-
vinylbenzoylbenzoic acid is converted to polyvinylathraquinone by treatment with
concentrated sulfuric acid or oleum. [SM]

SUB CODE: 07, 11/ SUBM DATE: 13Mar65/ ATD PRESS: 5109

Card 1/1

UDC: 661.183.123.2:678.746.22-136.662-9:547.673.1

ACCESSION NR: AP4011500

S/0051/64/016/001/0155/0159

AUTHOR: Chetverikov, A.G.; Chernyakovskiy, F.P.; Blyumenfel'd, L.A.; Lyubchenko, L.S.; Moshkovskiy, Yu.Sh.

TITLE: Light induced paramagnetic centers in triphenylmethane dye crystals

SOURCE: Optika i spektroskopiya, v.16, no.1, 1984, 155-159

TOPIC TAGS: paramagnetic center, color center, photoreaction, triphenylmethane dye, brilliant green, malachite green, EPR, photocoloring, photobleaching

ABSTRACT: In recent years a number of investigators have reported observing the appearance of paramagnetic centers in pigment and dye crystals under the influence of illumination. The present paper gives the results of preliminary experiments on the influence of illumination as regards formation of paramagnetic centers in the crystals of some triphenylmethane dyes, namely, brilliant green (I), and two methylated derivatives of malachite green (II & III), synthesized by the Grignard reaction. The structural formulas of the investigated dyes are shown in the Enclosure. The EPR spectra were measured on an EPR-2 IKhF spectrometer; the absorption and reflection spectra on an SF-10 spectrophotometer; In agreement with the results of V.E.

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ACC.NR: AP4011500

Kholmogorov and D.N.Glebovskiy (Opt.1 spektr.12,726,1962) and in contrast with the results of F.I.Chernyakovskiy, A.Ye. Kalmanson and L.A. Blyumenfel'd (Ibid.9,786,1960), the crystals of the investigated dyes precipitated from solution in the dark did not yield an EPR signal. EPR signals disappear upon illumination of the dye crystals with the light from a 3 watt incandescent lamp. It was found, in fact, that two types of paramagnetic centers form in dye I. Heating of the crystals results in fading of the EPR signal. In the course of the investigation it was also found that in addition to formation of paramagnetic centers, illumination results in reversible change in the color of the dye. A tentative interpretation of the results is given, but thorough analysis must await completion of quantitative measurements which are now underway. Orig.art.has: 3 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 15Apr63

DATE ACQ: 14Feb64

ENCL: 01

SUB CODE: PH

NR REF SOV: 008

OTHER: 003

Card *2/32*

CHEVERIKOV, A. G.

"Data on the serum therapy of influenza," by F. G. Epshteyn, A. S. Levinson,
Z. A. Semashko, A. G. Chetverikov, M. Vital, M. A. Belvintseva, K. G. Karatayeva,
N. N. Malkova, R. Ye. Gel'shteyn, Ye. G. Korabishcher, A. A. Krums, K. I. Matvayeva,

Voprosy Meditsinskoy Virusologii, Moscow, No. 2, 1949, pp. 278-287

KALMANSON, A.E.; LIPCHINA, L.P.; ~~CHE~~CHETVERIKOV, A.G.

Electron paramagnetic resonance study of the interaction of tumor and normal cells with semiquinone ion radicals originating from the inhibitors of free-radical processes. Biofizika 6 no.4:410-423 '61.
(MIRA 14:7)

1. Institut khimicheskoy fiziki AN SSSR.
(CANCER) (PARAMAGNETIC RESONANCE AND RELAXATION)
(QUINONES)

YELKHOVSKAYA, Ye.S.; KALMANSON, A.E.; LIPCHINA, L.P.; TVERITINOV, V.N.;
CHETVERIKOV, A.G.

Difference in the sensitivity to propl gallate in tissues of hepatoma
and normal liver. Dokl. AN SSSR 139 no.4:996-998 Ag '61. (MIRA 14:7)

1. Institut khimicheskoy fiziki AN SSSR i Moskovskiy gosudarstvennyy
universitet im. M.V. Lomonosova. Predstavleno akademikom V.N.
Kondrat'yevym.

(GALLIC ACID) (LIVER--TUMORS)

KARIMSON, A.E.; LIFCHIK, L.P.; CHETVEPRUKOV, A.G.

Difference in the sensitivity to propylgallate in proliferating and nonproliferating tissues. Dokl. AN SSSR 141 no.1:230-232 N '61. (MIRA 14:11)

1. Institut Khimicheskoy fiziki AN SSSR. Predstavleno akademikom V.N.Kondrat'yevym.

(Gallic acid)

(Oxidation, Physiological)

(Radicals(Chemistry))

YELKHOVSKAYA, Ye.S.; LIPCHINA, L.P.; CHETVERIKOV, A.G.

Interaction of propylgallate with the Rous's sarcoma virus
adsorbed on erythrocytes and stromas. Dokl. AN SSSR 142
no.2:465-467 Ja '62. (MIRA 15:2)

1. Institut khimicheskoy fiziki AN SSSR. Predstavleno
akademikom V.N.Kondrat'yevym.
(Gallic acid)
(Viruses)

KALMANSON, A.E.; KHARITONENKOV, I.G.; CHETVERIKOV, A.G.;
BLYUMENFEL'D, L.A.

Vapor-flow technique in the investigation of electron spin
resonance spectra of free radicals under heterogeneous con-
ditions. Biofizika 8 no.6:722-727 '63. (MIRA 17:7)

CHEPVERIKOV, A.G.; KALMANSON, A.E.; KHARITONENKOV, I.G.;
BEYUMENFEL'D, L.A.

Study of free radicals in biological objects generated during the course of enzymatic reactions by the electron paramagnetic resonance method. Biofizika 9 no. 1:18-24 '64. (MIRA 17:7)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

ACCESSION NR: AP4022481

S/0217/64/009/002/0172/0179

AUTHOR: Kharitonov, I. G.; Kalmanson, A. E.; Chetverikov, A. G.; Blyumenfel'd, L. A.

TITLE: Vapor jet method of investigating the appearance and loss of heptaquinone free radicals in model biological oxidation systems

SOURCE: Biofizika, v. 9, no. 2, 1964, 172-179

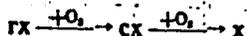
TOPIC TAGS: heptaquinone free radical, biological oxidation system, oxidation-reduction reaction, ethylgallate, n-benzoquinone, vicasol, methinone, rutin, quercetin, EPR spectroscopy, vapor jet EPR spectroscopy, EPR spectrum hyperfine structure, sorbed state, soluble state, free radical concentration, argon, oxygen, solvent vapor, amplitude signal, heptaquinone molecule, electron transfer mechanism

ABSTRACT: Ethylgallate, n-benzoquinone, vicasol (a water-soluble bisulfite vitamin K derivative), methinone (water insoluble vitamin K) and flavones (rutin and quercetin) were investigated by EPR spectroscopy to determine the nature of heptaquinone free radicals formed during oxidation-reduction reactions in biological systems.

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The substances were first analyzed by standard EPR spectroscopy methods and further analyzed by a vapor jet EPR spectroscopy method developed by the authors. The advantage of the vapor jet method is that free radicals adsorbed by different proteins can be studied over a wide range of time intervals and the ionization stage can be separated from the stage when free radicals appear. With this method the reaction of direct oxidation kinetics may be expressed as:



where RX - completely reduced (hydroquinone) form of investigated compound, CX - free radical (heptaquinone) form, and X - completely oxidized (quinone) form. For the vapor jet method, a solution of the investigated substance with 1 to 2% sodium alkoxide was placed on a paper filter in an inert gas atmosphere. Then the substance was dried with an argon jet or other gas jet and placed into an ampule for EPR spectroscopy. The absence of a hyperfine structure in the standard EPR spectra for substances analyzed in a sorbed state indicated that the radicals are rigidly bound to the base. EPR spectra for the same substances in a soluble state disclosed a hyperfine structure

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ACCESSION NR: AP4022481

indicating the presence of highly mobile heptaquinone radicals. On the basis of these results, the effects of argon, oxygen, and nitrogen jets combined with various solvent vapors on heptaquinone free radical concentrations were investigated in the substances in varying sorbed and soluble states. Amplitude signals for the various effects are presented, but no conclusions are made. Experimental data shows that heptaquinone molecules sorbed on the polar bases can transfer an electron to one another if the medium has a sufficient number of protons capable of compensating for the charges that form. Possible mechanisms for this transfer are suggested. "The authors express their gratitude to their colleagues at the State Scientific-Research Institute of Vitaminology of the Ministry of Health USSR for the vicasol, methinone, rutin and quercetin preparations." Orig. art. has: 9 figures and 3 formulas.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR, Moskva (Institute of Chemical Physics AN SSSR)

SUBMITTED: 27Jun63

DATE ACQ: 13Apr64

ENCL: 00

SUB CODE: LS

NR REF SOV: 003

OTHER: 003

Card

CHEVERTIKOV, A.G.

Study of electron paramagnetic resonance spectra of biological specimens. Biofizika 9 no.6:678-680 '64. (MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

CHEVERIKOV, A.G.; CHERNYAKOVSKIY, F.P.; BLYUMENFEL'D, L.A.; LYUBCHENKO, L.S.;
MOSHKOVSKIY, Yu.Sh.

Photoinduction of paramagnetic centers in crystals of triphenylmethane
dyes. Opt. i spektr. 16 no.1:155-159 Ja '64. (MIRA 17:3)

L 6715-65 WT(m)/EPP(c)/EWP(j) Pc-h/Pr-h RPL/AFWL/AS(mp)-2/RAEM(c)/SSD/
ASD(a)-EPP(i)/ES:gs)-SD(t) WW/JFW/RM
ACCESSION NR: AP4042208 5/0020/64/157/000/0151/100

AUTHOR: Blyumenfel'd, L. A.; Gribanov, V. A./ Lyubchenko, L. S./ Chernyakovsky,
P. P./ Chetverikov, A. G.

TITLE: The appearance of paramagnetic centers and EMP during electrochemical
reactions in polycrystals of triphenylmethane dyes 15

SOURCE: AN SSSR. Doklady*, v. 157, no. 2, 1964, 381-383

TOPIC TAGS: paramagnetic center, electromotive force, electrochemical reaction,
triphenylmethane dye, polycrystal of triphenylmethane dye electron magnetic
resonance, electron paramagnetic resonance, Ohm's law, singlet, free radical,
Curie law, triphenylmethane dye conductivity, solid triphenylmethane conductivity
dependence

ABSTRACT: In continuation of earlier work which showed electron magnetic resonance (emr) signals in polycrystalline specimens of brilliant green subjected to artificial light, the authors describe some new electric and magnetic phenomena observed upon passing an electric current through pressed tablets of emr specimens of the same and other dyes (see formulas I-VII). All tests were conducted.

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ACCESSION NR: AP4042208

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with compound I and apply to the other dyes. Electrodes which did not influence electric and magnetic properties were inserted into the tablets. Positive deviations from Ohm's law were observed. With direct current, conductivity increased with time and voltage. It was 10^{-8} ohm $^{-1}$. cm $^{-1}$ at room temperature and 300 v/cm. The current passing through the tablet gave rise to potentials of the same sign (much like charging an accumulator with reached e.g. 75 v with a 300 v current in a 0.15 cm thick tablet. A singlet epr (electron paramagnetic resonance) signal with g-factor appeared as the current passed through the tablet, indicating the appearance of free-radical/neutral compounds at the cathode. Its dynamics may be seen from Fig. 2 (encl.) Test showed the paramagnetic centers located close to the cathode. Increasing the temperature led to rapid disappearance of the signal upon discharge. Studies of this motion between 300 and 77 K showed that its intensity did not obey the Curie law; it coincided with the temperature dependency of the "narrow" epr light signal. Orig. art. has: 2 figures and 7 formulas.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Physical Chemistry, Academy of sciences, SSSR)

SUBMITTED: 24Feb64

ENCL: 02

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